

CLAIMS

- 1. Method for increasing the density of a perovskite, which comprises the steps of:
 - (a) placing a perovskite feedstock in a high-pressure cell of a high pressure/high temperature (HP/HT) apparatus;

(b)

subjecting said feedstock to pressures in excess of about 2 Kbar and temperatures above about 800° C for time in excess of 3 minutes to produce and cubic perovskite product having a density which is greater than said preform; and

recovering said perovskite product.

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The method of claim 1, wherein said perovskite can be represented by the structure, ABO₃, where:
A is one or more of Na⁺, K⁺, Rb⁺, Ag⁺, Ca⁺², Sr⁺², Ba⁺², Pb⁺², La⁺³, Pr⁺³, Nb⁺³, Bi⁺³, Y⁺³, Ce⁺⁴, or Th⁺⁴; and
B is one or more of Li⁺, Cu⁺², Mg⁺², Ti⁺³, V⁺³ Cr⁺³ Mn⁺³, Fe⁺³, Co⁺³, Al⁺³, Ni⁺³, Rh⁺³, Hf⁺⁴, Ti⁺⁴, Zr⁺⁴, Mn⁺⁴, Ru⁺⁴, Pt⁺⁴, Nb⁺⁵, Ta⁺⁵, Mo⁺⁶, or W⁺⁶.

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- 3. The method of claim 2, wherein said preform is SrRuO₃.
- 20 4. The method of claim 1, wherein said perovskite feedstock is one or more of powder or a preform.
 - 5. The method of claim 1, wherein said perovskite product has a density of greater than about 60% of its theoretical density.

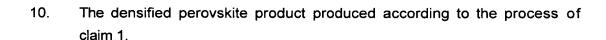
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- 6. The method of claim 5, wherein said perovskite product has a density of greater than about 90% of its theoretical density.
- 7. The method of claim 1, wherein step (b) is conducted for a time ranging from between about 3 minutes and 24 hours.
 - 8. The method of claim 1, wherein said pressure ranges from about 2 to 75 Kbar and said temperature ranges from about 800° to 1600° C.
- The method of claim 7, wherein said pressure ranges from about 2 to 75 Kbar and said temperature ranges from about 800° to 1600° C.

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- 5 11. The densified perovskite product produced according to the process of claim 2.
 - 12. The densified perovskite product produced according to the process of claim 3.

13. The densified perovskite product produced according to the process of claim 4.

- 14. The densified perovskite product produced according to the process of claim 5.
 - 15. The densified perovskite product produced according to the process of claim 6.
- 20 16. The densified perovskite product produced according to the process of claim 7.
 - 17. The densified perovskite product produced according to the process of claim 8.
 - 18. The densified perovskite product produced according to the process of claim 9.
- 19. Method for increasing the density of a perovskite, which comprises the steps of:
 - (a) placing a perovskite feedstock in a high-pressure cell of a high pressure/high temperature (HP/HT) apparatus;
 - (b) subjecting said feedstock to pressures in excess of about 2 Kbar and temperatures above about 800° C for time adequate to increase the density of said feedstock to above about 60% of its theoretical density; and

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- (b) recovering said perovskite product having a density above about 60% of it theoretical density.
- The method of claim 19, wherein said perovskite can be represented by the structure, ABO₃, where:

 A is one or more elements of Na⁺, K⁺, Rb⁺, Ag⁺, Ca⁺², Sr⁺², Ba⁺², Pb⁺², La⁺³, Pr⁺³, Nb⁺³, Bi⁺³, Y⁺³, Ce⁺⁴, or Th⁺⁴; and

 B is one or more elements of Li⁺, Cu⁺², Mg⁺², Ti⁺³, V⁺³, Cr⁺³, Mn⁺³, Fe⁺³, Co⁺³, Al⁺³, Ni⁺³, Ni⁺³, Rh⁺³, Hf⁺⁴, Ti⁺⁴, Zr⁺⁴, Mn⁺⁴, Ru⁺⁴, Pt⁺⁴, Nb⁺⁵, Ta⁺⁵, Mo⁺⁶, or W⁺⁶.
 - 21. The method of claim 19, wherein said preform is SrRuO₃.
- The method of claim 19, wherein said perovskite feedstock is one or more of powder or a preform.
 - 23. The method of claim 19, wherein said perovskite product has a density of greater than about 90% of its theoretical density.
- 20 24. The method of claim 19, wherein step (b) is conducted for a time ranging from between about 3 minutes and 24 hours.
 - 25. The method of claim 19, wherein said pressure ranges from about 2 to 75 Kbar and said temperature ranges from about 800° to 1600° C.
 - 26. The method of claim 25, wherein said pressure ranges from about 2 to 75 Kbar and said temperature ranges from about 800° to 1600° C.